



**United States
Department of
Agriculture**

**Agricultural
Marketing
Service**

**Dairy
Division**

United States Standards for Grades of Dry Whole Milk

Effective May 13, 1983

United States Standards for Dry Whole Milk¹

Definitions

§ 58.2701 *Dry whole milk.*

“Dry whole milk” made by the Spray process or Roller process is the product obtained by removal of water only from pasteurized milk which may have been homogenized. Alternatively, dry whole milk may be obtained by blending fluid, condensed, or dried nonfat milk with liquid or dried cream or with fluid, condensed, or dried milk, as appropriate, provided the resulting dry whole milk is equivalent in composition to that obtained by drying. It contains the lactose, milk proteins, milkfat, and milk minerals in the same relative proportions as the milk from which it was made. It may be optionally fortified with either Vitamins A or D or both.

§ 58.2702 *Milk.*

The term “Milk”, when used in this part, means milk produced by healthy cows and pasteurized at a temperature of 161°F. for 15 seconds or its equivalent in bacterial destruction before or during the manufacture of dry whole milk.

U.S. Grades

§ 58.2703 *Nomenclature of U.S. grades.*

The nomenclature of U.S. grades is as follows:

(a) U.S. Extra grade.

(b) U.S. Standard grade.

§ 58.2704 *Basis for determination of U.S. grades.*

The U.S. grades of dry whole milk are determined on the basis of flavor, physical appearance, bacterial estimate, coliform estimate, direct microscopic count, milkfat content, moisture content, scorched particle content, and solubility index.

¹Compliance with these standards does not excuse failure to comply with the provisions of the Federal Food, Drug, and Cosmetic Act.

§ 58.2705 *Specifications for U.S. grades.*

(a) *U.S. Extra grade.* U.S. Extra grade dry whole milk shall conform to the following requirements (See tables I, II, and III):

(1) *Flavor.* (applies to the reconstituted product). Shall be sweet, pleasing and desirable. It may possess a slight feed flavor; and a definite cooked flavor. It shall be free from undesirable flavors.

(2) *Physical appearance.* Shall be white or light cream color, free from lumps that do not break up under slight pressure, and practically free from visible dark particles. The reconstituted product shall be free from graininess.

(3) *Bacterial estimate.* Not more than 50,000 per gram standard plate count.

(4) *Coliform estimate.* Not more than 10 per gram.

(5) *Milkfat content.* Not less than 26.0%, but less than 40.0%.

(6) *Moisture content.* Not more than 4.5% (as determined by weight of moisture on a milk solids not fat basis).

(7) *Scorched particle content.* Not more than 15.0 mg. for spray process, and 22.5 mg. for roller process.

(8) *Solubility index.* Not more than 1.0 ml. for spray process, and 15.0 ml. for roller process.

(b) *U.S. Standard grade.* U.S. Standard grade dry whole milk shall conform to the following requirements (See tables I, II, and III):

(1) *Flavor.* (applies to the reconstituted product). Shall be sweet and should have a pleasing flavor. It may possess the following flavors to a slight degree: bitter, oxidized, scorched, stale, and storage; and to a definite degree: feed and cooked. It shall be free from undesirable flavors.

(2) *Physical appearance.* Should be white or light cream color, but may possess a slight unnatural color; and shall be free from lumps that do not break up under moderate pressure; and reasonably free from visible dark particles. The reconstituted product shall be reasonably free from graininess.

(3) *Bacterial estimate.* Not more than 100,000 per gram standard plate count.

(4) *Coliform estimate.* Not more than 10 per gram.

(5) *Milkfat content.* Not less than 26.0%, but less than 40.0%.

(6) *Moisture content.* Not more than 5.0% (as determined by weight of moisture on a milk solids not fat basis).

(7) *Scorched particle content.* Not more than 22.5 mg. for spray process and 32.5 mg. for roller process.

(8) *Solubility index.* Not more than 1.5 ml. spray process, and 15.0 ml. for roller process.

§ 58.2706 *Basis for oxygen content determination.*

Oxygen content (if gas packed) is not a U.S. grade requirement. Percentage of oxygen content will be made available only on a U.S. graded product and the results will be shown on the grading certificate as follows:

Oxygen Content

Not more than 2% Oxygen, or Not more than 3% Oxygen, or Oxygen content_____%.

Table I.--Classification of Flavor

Identification of flavor characteristics	U.S. extra grade	U.S. standard grade
Cooked	Definite	Definite.
Feed	Slight	Definite.
Bitter	--	Slight.
Oxidized	--	Slight.
Scorched	--	Slight.
Stale	--	Slight.
Storage	--	Slight.

Table II.--Classification of Physical Appearance

Identification of physical appearance characteristics	U.S. extra grade	U.S. standard grade
Dry product:		
Unnatural color.....	None	Slight.
Lumps.....	Slight pressure	Moderate pressure.
Visible dark particles.....	Practically free	Reasonably free.
Reconstituted product:		
Grainy.....	Free	Reasonably free.

Table III.--Classification According to Laboratory Analysis

Laboratory tests	U.S. extra grade	U.S. standard grade
Bacterial estimate, SPC/gram.	50,000	100,000.
Coliform estimate/gram.	10	10.
Milkfat content, percent.	Not less than 26.0, but less than 40.0.	Not less than 26.0, but less than 40.0.
Moisture content, percent ¹ .	4.5	5.0
Scorched particle content, mg:		
Spray proc.	15.0	22.5.
Roller proc.	22.5	32.5.
Solubility index, ml:		
Spray proc.	1.0	1.5.
Roller proc.	15.0	15.0.

¹Milk solids not fat basis.

§ 58.2707 *Optional tests.*

There are certain optional test requirements in addition to those specified in section 58.2705. Testing for these requirements may be done occasionally at the option of the Department and will be done whenever they are requested by an interested party.

These optional requirements are as follows:

(a) *Copper content.* Not more than 1.5 p.p.m.

(b) *Iron content.* Not more than 10 p.p.m.

(c) *Titrateable acidity.* Not more than 0.15 percent.

(d) *Vitamin addition.* When either or both Vitamin A or D is added, they shall be present in such quantity that, when prepared according to label directions, each quart of the reconstituted product shall contain:

Vitamin A. Not less than 2,000 I.U.
Vitamin D. 400 I.U.

§ 58.2708 *U.S. grades not assignable.*

Dry whole milk shall not be assigned a U.S. grade for one or more of the following reasons:

- (a) Fails to meet the requirements for U.S. Standard grade.
- (b) Has a direct microscopic clump count exceeding 100 million per gram.
- (c) Fails to meet the requirements for any optional tests as specified in section 58.2707, when such tests have been performed.
- (d) Produced in a plant found on inspection to be using unsatisfactory manufacturing practices, equipment, or facilities, or to be operating under unsanitary plant conditions.
- (e) Produced in a plant which is not USDA approved.

§ 58.2709 *Test methods.*

All required tests, and optional tests when specified, shall be performed in accordance with “Methods of Laboratory Analysis”, DA Instruction No. 918-103 (dry milk products series), Dairy Grading Branch, AMS, U.S. Department of Agriculture, Washington, DC 20250; and “Official Methods of Analysis of the Association of Official Analytical Chemists”, 13th Ed. or latest revision.

Explanation of Terms

§ 58.2710 *Explanation of terms.*

- (a) *With respect to flavor:*
 - (1) *Slight.* An attribute which is barely identifiable and present only to a small degree.
 - (2) *Definite.* An attribute which is readily identifiable and present to a substantial degree.
 - (3) *Undesirable.* Those flavors in excess of the intensity permitted or those not otherwise listed.
 - (4) *Bitter.* Similar to taste of quinine and produces a puckery sensation.
 - (5) *Cooked.* Similar to a custard flavor and imparts a smooth aftertaste.
 - (6) *Feed.* Feed flavors (such as alfalfa, sweet-clover, silage, or similar feed) in milk carried through into the dry whole milk.
 - (7) *Oxidized.* A flavor resembling cardboard and sometimes referred to as “cappy” or “tallowy”.

- (8) *Scorched*. A more intensified flavor than “cooked” and imparts a burnt aftertaste.
- (9) *Stale, Storage*. Lacking in freshness and imparting a “rough” or “harsh” aftertaste.
- (10) *Sweet*. The lack of detectable acidity.

(b) *With respect to physical appearance:*

- (1) *Practically free*. Is barely identifiable upon examination and present to a very small degree.
- (2) *Reasonable free*. Is easily identifiable upon examination and present to a small degree.
- (3) *Slight pressure*. Lumps fall apart with only light touch.
- (4) *Moderate pressure*. Only sufficient pressure to disintegrate the lumps readily.
- (5) *Grainy*. Minute particles of undissolved powder appearing in a thin film on the surface of a glass or tumbler.
- (6) *Unnatural color*. A color that is more intense than light cream and/or is brownish, dull or grey-like.
- (7) *Lumps*. Loss of powdery consistency but not caked into hard chunks.
- (8) *Visible dark particles*. The presence of scorched or discolored specks readily visible to the eye.